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INSECT PEST SURVEY

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STATUS OF THE EUROPEAN CORN BORER IN 1942

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Distribution

Westward distribution of the European corn borer in 1942 was the most extensive determined in recent years. As a result, the insect was found throughout western Illinois and across southwestern Wisconsin, and was recorded for the first time in Missouri and Iowa. In Illinois all but 7 counties in the extreme southern part of the State are now known to be infested; in Iowa the new infestation was found in 19 eastern counties, extending at one point in the State into the fourth tier of counties west of the Mississippi River; and in Missouri the initial presence of the borer appeared in 5 counties along the Mississippi from the Iowa line south to St. Louis. In Wisconsin the borer was first found

^{1/} The data on the distribution and abundance of the European corn borer presented in this report were accumulated by the Bureau of Entomology and Plant Quarantine and various interested States and were assembled and tabulated at Lafayette, Ind., substation of the laboratory for European corn borer research, Toledo, Ohio, with W. A. Baker in charge. In addition to activity by the Bureau, the survey in 1942 was conducted in 78 counties of Indiana by the Indiana State Conservation Department; in 13 counties of Maine, in all 19 counties of New Jersey, and in 12 counties of Vermont, by the State departments of agriculture of those States; in 16 counties of New York, including Long Island, by the New York Agricultural Experiment Station at Geneva and the New York State Department of Agriculture, cooperating; and in 7 counties of New Hampshire, in half of the 24 counties surveyed in Illinois, and in half of the 3 counties of Delaware, by the agricultural experiment stations of those States.

New county records of the European corn borer in 1942 were contributed by the Natural History Survey and the State Department of Agriculture in Illinois; by the State Conservation Department of Indiana; by the State departments of agriculture of Missouri, North Carolina, Virginia, and Wisconsin; and by the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture. The Bureau appreciates the interest and cooperation of all States in which the survey was conducted and from which new records of distribution were obtained in 1942.

in 1942 in 3 counties in the southwestern corner of the State and in 1 isolated county to the northwest, and the known infestation in southwestern and southeastern Indiana was extended to the Ohio River. Only slight spread of the insect was recorded from the Eastern States in 1942, 3 newly infested counties being found in eastern Virginia and 1 in northeastern North Carolina.

The following list gives the counties in the above-mentioned States in which the European corn borer was found for the first time in 1942, and on the accompanying map is shown the known distribution of the insect, including the 1942 spread.

Illinois: Adams, Bond, Brown, Calhoun, Cass, Clay, Clinton, Edwards, Effingham, Fayette, Franklin, Fulton, Gallatin, Greene, Hamilton, Hancock, Henderson, Henry, Jackson, Jasper, Jefferson, Jersey, Jo Daviess, Knox, McDonough, Macoupin, Madison, Marion, Mason, Menard, Mercer, Monroe, Montgomery, Morgan, Perry, Pike, Randolph, Richland, Rock Island, St. Clair, Sangamon, Schuyler, Scott, Union, Wabash, Warren, Washington, Wayne, White, and Whiteside.

Indiana: Brown, Daviess, Greene, Knox, Ohio, Pike, Posey, Spencer, Sullivan, and Switzerland.

Iowa: Cedar, Clayton, Clinton, Des Moines, Dubuque, Henry, Jackson, Jefferson, Johnson, Jones, Keokuk, Lee, Linn, Louisa, Muscatine, Scott, Van Buren, Wapello, and Washington.

Missouri: Clark, Lewis, Lincoln, Marion, Pike, Ralls, St. Charles, and St. Louis.

North Carolina: Chowan.

Virginia: Fauquier, King and Queen, and Spotsylvania.

Wisconsin: Dunn, Grant, Iowa, and Lafayette.

Fall Abundance

The abundance of the European corn borer in corn in the fall of 1942 was determined for a considerable part of the infested area. In all, 4,165 cornfields were examined in 308 counties, in 18 infested States, by the Bureau and various State agencies. Except in Delaware, Indiana, and Maine, the survey procedure in 1942 followed that in general use by the Bureau during recent years. By this method, 10 cornfields at random were sampled within each county, the count of infestation being obtained by examining 25 consecutive corn plants taken at a given distance within a field from near the mid point of its most accessible edge, and the number of borers per infested plant being determined by dissecting the first 2 plants found infested. The procedure

in Delaware differed only to the extent of doubling the number of fields examined per county. In Maine 25 to 30 fields were surveyed in each county and in Indiana an average of about 20 fields was examined, the exact quota per county in the latter State varying with the number of townships within a unit. The population figure for each field in the Maine and Indiana surveys was based on an examination of 100 plants and the dissection of 5 infested plants. In either survey procedure the product of the percentage of plant infestation in a field and the average number of borers per infested plant provided a figure designated as the average number of borers per 100 plants. The population data derived in this way for the individual fields were then grouped in the calculation of county averages.

A summary of the data on borer abundance in corn for all counties and States surveyed in 1942 is presented in table 1, in which the data obtained from the 1941 survey are also given for comparison. In table 2 the average numbers of borers per 100 plants are given for each county surveyed in 1942 and all possible comparisons are made with similar data from 1941. States and counties are arranged alphabetically in the presentation of the data. In reading the tabulated data it should be noted that a zero recorded for any county indicates a population so low that no infested plants occurred within the specified counts and does not necessarily mean the complete absence of the borer. On the accompanying map shaded areas indicate the relative abundance in corn in that part of the infested area surveyed in 1942. A brief discussion of the 1942 survey follows.

The European corn borer in 1942 continued its build-up of numbers in Indiana and Illinois, and in certain sections of these States the insect was as abundant as ever found in the North Central States. The increase in populations of the borer in 62 comparable counties in Indiana was from 34.9 borers per 100 plants in 1941 to 193.1 in 1942, and in 6 comparable counties of Illinois, it was from 5.9 borers per 100 plants in 1941 to 110.6 in 1942. In each of 11 counties across the middle of Indiana there was an average of over 300 borers per 100 plants in 1942. These 11 counties averaged 375.7 larvae per 100 plants, varying per county from 302.3 to 501.7 borers per 100 plants. The 4 highest counties in Indiana, with their respective numbers of borers per 100 plants, were Blackford, 501.7, Grant, 488.9, Delaware, 412.1, and Wayne, 401.6. In 44, or 56.4 percent, of the 78 counties surveyed in Indiana in 1942, the numbers of borers per 100 plants averaged over 100. Populations of 101 to 300 larvae per 100 plants occurred in 6, or 25 percent, of the 24 counties surveyed in Illinois in 1942. Abundance of the pest in these counties, Iroquois, Kankakee, Grundy, Vermilion, Champaign, and Livingston, ranged in order from a maximum of 293.8 borers per 100 plants in Iroquois to a minimum of 123 in Livingston County.

It should be noted that the survey in Illinois and the greater part of the survey work in Indiana took place late in the fall and that a very considerable part of the borer populations entering the counts were of the second generation.

The European corn borer in Michigan and in the western half of Ohio remained somewhat static from the fall of 1941 to the fall of 1942, with a trend toward a decrease in numbers in the more southern of the comparable counties in Ohio. Relatively little change occurred in southeastern Michigan between the average of 54.3 borers per 100 plants in 1941 and 49.1 in 1942. The comparable part of northwestern Ohio, comprising 26 counties, showed a decrease from 151.4 larvae per 100 plants in 1941 to 71.4 in 1942.

In the East radical changes in populations of the borer from 1941 to 1942 were not widespread. Except for an increase in the State of New Hampshire, taken as a whole, from 5.3 borers per 100 plants in 1941 to 12.2 in 1942, the fall status of the insect remained about the same in New England during these 2 years. On a State-wide basis, comprising only the counties surveyed in both years, increases of significance from 1941 to 1942 appeared in New York, Pennsylvania, Delaware, Virginia, and North Carolina, largely accounted for by greater abundance of the insect within one or two scattered counties in each State. The status of the borer in New Jersey and Maryland did not change appreciably from 1941 to 1942. Populations exceeding 300 borers per 100 plants occurred on Long Island and in Niagara County, N. Y., in Middlesex County, N. J., and in Bucks and Montgomery Counties, Pa. Among the 140 counties surveyed in the Eastern States in 1942, there were 31, or 22.1 percent, in which the number of borers per 100 plants averaged between 101 and 300.

Apparently weather conditions in 1942, while not particularly adverse to the European corn borer in any part of the infested area, were especially favorable in Indiana and Illinois as well as farther west in the Corn Belt in Iowa and Missouri. These weather conditions so advantageous to the borer were also of a type conducive to good corn production.

Summer Abundance in Sweet Corn

Table 3 summarizes the field data procured in 1942 in certain sections of infested States to show the relative abundance of the European corn borer in early sweet corn grown for market, and in a few fields of canning corn in Illinois. As a rule, the fields surveyed represented the most heavily infested ones within a given locality.

The corn borer increased in numbers in early market sweet corn in New Haven County, Conn., from an unusually low average for the locality of 1.1 borers per plant in 1941 to 7.9 in 1942. The pest was less abundant in sweet corn in Burlington County, N. J., in 1942 (4 borers per plant) than in 1941 (8.9 borers per plant). Populations were also lower in Lucas County, Ohio, where early market sweet corn was infested with 8.5 borers per plant in 1942 and 12.4 in 1941, and in Monroe County, Mich., where the number of borers per plant in 1942 was 6.7 as compared with 10.7 in 1941. Nevertheless, in the last 3 localities as well as in Connecticut,

Table 2.--Data on European corn borer abundance in corn, fall of 1942, and comparisons with data for 1941

State and county	Average borers per 100 plants	1941	1942	State and county	Average borers per 100 plants	1941	1942
	Number		Number		Number		Number
<u>Connecticut</u>				<u>Illinois (Cont'd)</u>			
Fairfield	121.3		91.3	Vermillion	20.2		162.2
Hartford	235.8		106.4	Whiteside	-		10.4
Litchfield	9.6		9.6	Woodford	-		50.0
Middlesex	63.6		105.6				
New Haven	143.4		145.4	Average:			
Tolland	41.6		22.6	6 counties	5.9		110.6
New London	28.2		31.2	24 counties	-		64.5
Windham	11.0		12.8				
Average:							
3 counties	31.9		71.9	<u>Indiana:</u>			
<u>Delaware:</u>				Adams	34.0		171.2
Kent	28.3		43.9	Allen	71.0		174.6
New Castle	26.7		117.2	Bartholomew	5.8		114.4
Sussex	65.4		157.3	Benton	13.6		302.5
Average:				Blackford	128.4		501.7
3 counties	40.1		106.1	Boone	26.3		135.0
<u>Illinois:</u>				Brown	-		42.6
Boone	-		3.2	Carroll	109.4		295.4
Bureau	-		7.2	Cass	72.6		375.2
Champaign	4.2		143.0	Clay	1.1		93.4
Christian	-		5.4	Clinton	45.0		248.8
Crawford	-		13.2	Daviess	-		2.1
De Kalb	0.8		41.0	Dearborn	-		46.2
Edgar	-		40.6	Decatur	11.4		70.0
Grundy	-		193.6	De Kalb	32.8		94.3
Henry	-		6.4	Delaware	69.0		412.1
Iroquois	-		293.8	Elkhart	13.2		68.7
Kankakee	3.2		240.8	Fayette	61.6		280.6
Lake	7.2		11.8	Fountain	14.4		268.3
La Salle	-		36.4	Franklin	55.2		90.0
Livingston	-		123.0	Fulton	19.5		281.2
Logan	-		26.0	Gibson	-		1.5
Macon	-		24.2	Grant	74.6		438.9
McLean	0		64.6	Greene	-		16.3
Ogle	-		16.4	Hamilton	42.3		196.2
Peoria	-		16.4	Hancock	53.2		223.3
Rock Island	-		5.8	Hendricks	15.7		87.7
Sangamon	-		7.0	Henry	63.2		339.5
				Howard	90.0		303.2
				Huntington	58.4		156.8
				Jasper	18.3		224.6
				Jay	59.7		252.4
				Jefferson	-		5.9
				Johnson	20.0		234.2

Table 2.--Data on European corn borer abundance in corn, fall of 1942, and comparisons with data for 1941--Continued

State and county	Average borers per 100 plants		State and county	Average borers per 100 plants	
	1941	1942		1941	1942
	Number	Number		Number	Number
Indiana (Cont'd)			Maine:		
Knox	-	5.3	Androscoggin.....	6.4	2.7
Kosciusko.....	11.4	184.5	Cumberland	5.0	6.2
Lagrange	4.9	13.4	Franklin	1.0	2.0
Lake	4.0	34.0	Hancock	0.2	0.7
La Porte	1.6	71.4	Kennebec	5.5	2.1
Madison	98.3	243.3	Knox	0.1	4.0
Marion	52.3	220.7	Lincoln	2.0	1.8
Marshall	23.7	117.4	Oxford	0.5	1.0
Miami	23.8	292.1	Piscataquis	0	0.6
Montgomery	8.9	114.2	Sagadahoc	2.0	10.4
Morgan	4.1	84.3	Somerset	0.8	2.0
Newton	4.4	259.0	Waldo	0.3	1.5
Noble	29.9	32.5	York	2.2	11.2
Ohio	-	39.5			
Owen	0.5	10.7	Average:		
Parke	1.6	97.9	13 counties	1.5	3.6
Pike	-	0			
Porter	3.1	32.6	Maryland:		
Posey	-	1.0	Caroline	52.4	39.0
Pulaski	7.4	120.1	Charles	0	1.2
Putnam	1.7	98.2	Dorchester	22.4	17.4
Randolph	37.5	364.8	Kent	50.2	43.4
Ripley	-	20.9	Queen Annes	8.8	36.3
Rush	47.5	205.2	Somerset	15.8	13.8
St. Joseph	3.8	103.2	Talbot	100.0	47.6
Shelby	22.7	203.5	Wicomico	61.2	91.8
Spencer	-	0.3	Worcester	50.4	134.0
Starke	20.1	139.1			
Steuben	46.4	55.7	Average:		
Sullivan	-	12.5	9 counties	40.1	47.2
Switzerland	-	32.4			
Tippecanoe	16.1	340.4	Massachusetts:		
Tipton	134.3	283.4	Essex	21.0	39.6
Union	52.5	195.6	Franklin	3.8	3.2
Vanderburgh	-	0	Hampden	21.8	60.4
Vermillion	0.8	161.8	Hampshire	26.4	17.2
Viro	1.3	54.1	Middlesex	16.4	6.4
Wabash	35.4	203.9	Norfolk	67.2	33.4
Warrick	-	0	Worcester	7.2	3.5
Warren	22.2	201.7			
Wayne	50.2	401.6	Average:		
Wells	53.4	302.3	7 counties	23.4	23.4
White	40.6	198.9			
Whitley	25.3	47.8			
Average:					
62 counties:	34.9	193.1			
78 counties:	-	150.4			

Table 2.--Data on European corn borer abundance in corn, fall of 1942, and comparisons with data for 1941--Continued

State and county	Average borers per 100 plants		State and county	Average borers per 100 plants	
	1941	1942		1941	1942
	Number	Number		Number	Number
<u>Michigan:</u>			<u>New Jersey:</u>		
Allegan	-	4.2	Atlantic	72.8	23.6
Barrien	-	18.4	Bergen	108.8	190.6
Genesee	3.4	45.0	Burlington	235.6	273.4
Gratiot	93.0	12.4	Camden	121.8	122.7
Huron	137.6	60.8	Cape May	22.2	21.6
Kent	-	33.0	Cumberland	31.0	99.0
Leapeer	7.8	30.2	Essex-Union	101.4	75.8
Lenawee	102.6	42.8	Gloucester	82.0	95.8
Macomb	22.4	21.8	Hunterdon	46.2	87.0
Monroe	93.2	94.2	Mercer	610.6	166.4
Oakland	10.4	65.8	Middlesex	457.8	497.0
Ottawa	-	3.2	Monmouth	107.6	273.8
Saginaw	110.6	25.6	Morris	36.3	40.8
St. Clair	45.8	27.4	Ocean	94.9	68.7
Sanilac	15.8	19.2	Passaic	61.4	151.2
Tuscola	34.4	74.2	Salem	141.2	29.4
Van Buren	-	12.8	Somerset	33.0	112.4
Wayne	29.2	112.4	Sussex	12.8	17.2
			Warren	19.4	32.0
Average:					
13 counties	54.3	49.1	Average:		
18 counties	-	39.7	19 counties	126.9	125.3
<u>New Hampshire:</u>			<u>New York:</u>		
Belknap	4.2	5.6	Albany	3.6	43.0
Carroll	6.6	2.0	Columbia	8.8	54.8
Cheshire	5.2	47.2	Dutchess	2.0	72.4
Grafton	2.0	5.8	Erie	-	30.4
Hillsboro	1.6	3.6	Greene	3.0	15.0
Merrimack	3.2	7.2	Livingston	-	5.2
Rockingham	4.8	7.6	Monroe	20.6	30.4
Strafford	2.4	2.0	Nassau	257.2	173.6
Sullivan	18.0	28.6	Niagara	91.2	518.2
			Oneida	-	11.8
Average:			Onondaga	-	52.8
9 counties	5.3	12.2	Orange	0.4	161.6
			Orleans	96.6	30.6
			Putnam-Westchester	70.6	104.8
			Rensselaer	6.2	12.2
			Saratoga	1.2	14.8
			Schenectady	0.4	38.0
			Suffolk	64.8	576.6
			Ulster	2.0	172.4
			Wayne	18.0	120.8
			Average:		
			16 counties	40.4	155.6
			20 counties	-	129.5

Table 2.--Data on European corn borer abundance in corn, fall of 1942, and comparisons with data for 1941--Continued

State and county	Average borers per 100 plants		State and county	Average borers per 100 plants	
	1941	1942		1941	1942
	Number	Number		Number	Number
North Carolina:			Ohio (Cont'd):		
Camden.....	17.4	127.6	Warren	-	15.2
Currituck	4.8	33.8	Williams	18.4	52.0
Pasquotank	11.6	22.2	Wood	98.6	126.2
			Wyandot	13.6	23.8
Average:					
3 counties	11.3	61.2	Average:		
			26 counties:	151.4	71.4
Ohio:			39 counties:	-	57.2
Allen	78.6	61.6			
Auglaize	177.4	42.6	Pennsylvania:		
Butler.....	-	36.4	Adams	-	43.9
Champaign	-	38.0	Armstrong	-	11.6
Clark	-	33.4	Berks	22.8	31.0
Clinton	-	12.6	Bucks.....	117.0	433.2
Crawford	32.0	31.6	Centre	-	8.2
Darke	-	38.6	Chester	29.2	68.6
Defiance	69.0	50.6	Crawford	-	4.2
Delaware	57.0	15.8	Cumberland	-	2.0
Fayette	16.6	22.2	Delaware	129.8	261.4
Franklin	-	37.4	Erie	-	51.0
Fulton	267.0	108.0	Indiana	-	2.4
Greene	-	14.2	Lancaster	24.4	44.2
Hamilton	-	34.6	Lehigh	-	118.2
Hancock	136.2	110.4	Lebanon	-	3.2
Hardin	207.4	29.0	Montgomery	130.8	371.6
Henry	119.2	126.2	Monroe	-	5.0
Logan	316.6	57.0	Northampton ...	-	173.0
Lucas	200.2	98.2	Perry	-	2.8
Madison	-	37.8	Pike	-	0.4
Marion	248.6	125.4	Wayne	-	1.0
Mercer	272.4	9.4	Westmoreland ..	-	0
Miami	-	15.2	York	-	145.0
Montgomery	-	27.0			
Morrow	109.4	49.0	Average:		
Ottawa	39.0	24.6	6 counties:	75.7	201.7
Paulding	442.4	142.0	22 counties:	-	81.0
Preble	-	33.2			
Putnam	223.4	183.6	Rhode Island:		
Sandusky	72.2	56.4	Bristol-Newport	163.4	84.4
Seneca	81.2	68.6	Kent	14.4	19.4
Shelby	210.2	11.6	Providence	5.2	13.0
Union	121.6	22.6	Washington	47.2	74.2
Van Wert	307.6	207.2			
			Average:		
			4 counties:	57.6	47.8

Table 2.--Data on European corn borer abundance in corn, fall of 1942, and comparisons with data for 1941--Continued

State and county	Average borers per 100 plants	
	1941	1942
	Number	Number
<u>Vermont:</u>		
Addison	9.6	20.2
Bennington	8.0	90.9
Caledonia	5.4	3.6
Chittenden	21.4	5.8
Essex	0.4	1.6
Franklin	18.8	12.6
Grand Isle	26.0	14.2
Lamoille	7.6	4.0
Orange	6.0	8.4
Orleans	5.0	3.4
Rutland	24.0	20.6
Washington	35.4	9.4
Windham	12.4	25.6
Windsor	24.6	11.2
Average:		
14 counties	14.6	16.5
<u>Virginia:</u>		
Accomac	26.8	223.6
Fairfax	-	5.0
Loudoun	-	2.4
Nansemond	56.0	43.2
Norfolk	3.8	23.0
Northampton	60.2	236.4
Prince William	-	1.2
Princess Anne	29.4	420.0
Stafford	-	0
Average:		
5 counties	35.2	189.2
9 counties	-	106.1
<u>Wisconsin:</u>		
Calumet	2.0	25.6
Dodge	-	15.6
Fond du Lac	1.2	19.0
Manitowoc	24.4	30.6
Outagamie	-	11.2
Ozaukee	20.4	38.6
Sheboygan	47.8	71.8
Washington	5.6	13.2
Winnebago	-	21.8
Average:		
6 counties	16.9	33.1
9 counties	-	27.5

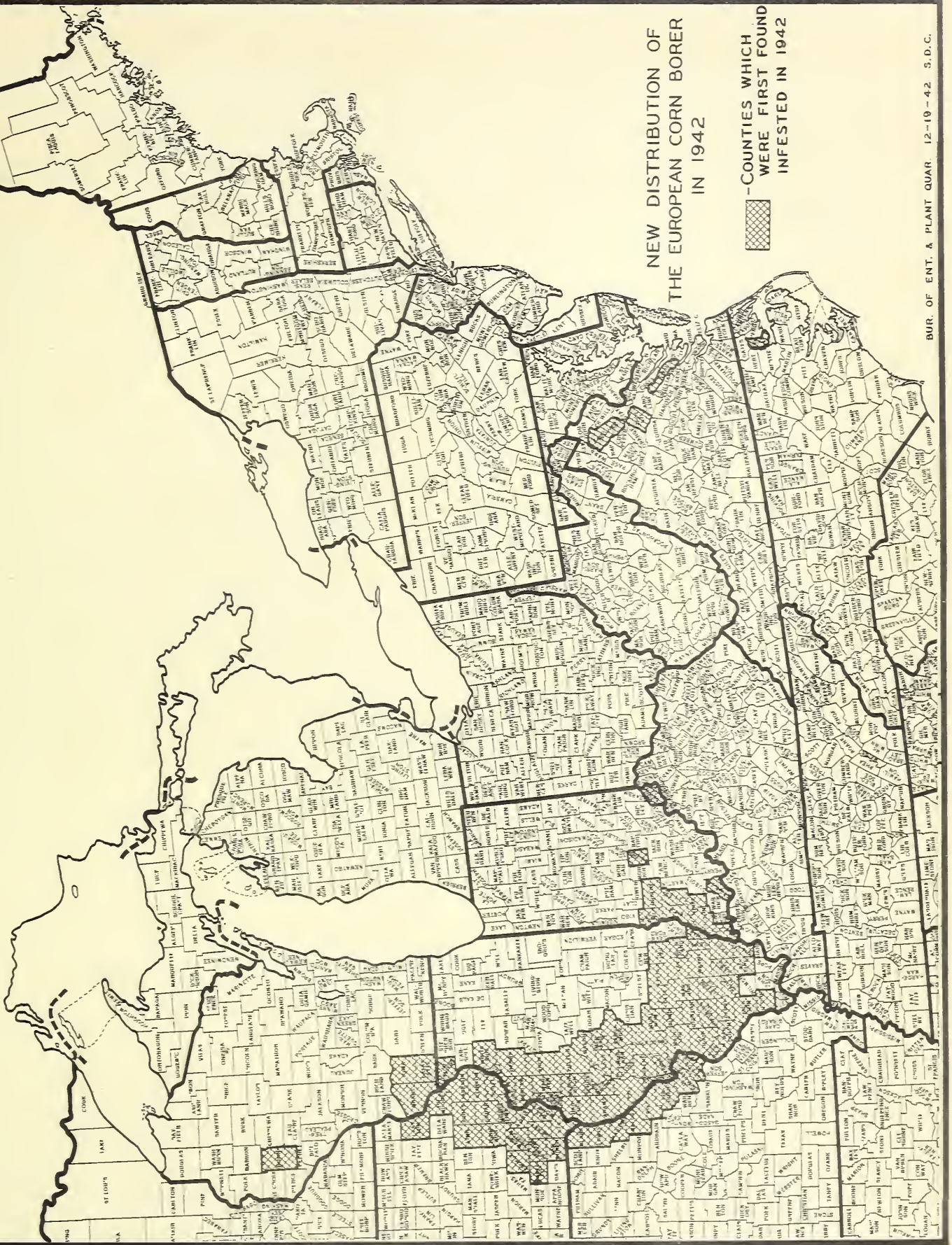
Table 3. - Data on European corn borer abundance in early sweet corn,
summers of 1941 and 1942

State and county	Locality	1941		1942	
		:Average borers:		:Average borers	
		:Fields:	per plant	:Fields:	per plant
		:Number:	Number	:Number:	Number
<u>Connecticut:</u>					
New Haven	New Haven	25	1.1	25	7.9
<u>Illinois:</u>					
Kankakee	Kankakee	-	-	8	12.3
Vermilion ^{1/}	Hoopeston	-	-	5	1.8
<u>Indiana:</u>					
Marion, Hamilton, and Hendricks	Indianapolis	-	-	19	13.0
<u>Michigan:</u>					
Monroe	Erie	5	10.7	5	6.7
<u>New Jersey:</u>					
Burlington	Beverly	29	8.9	25	4.0
<u>New York:</u>					
Monroe	Rochester	9	4.9	3	3.5
Niagara	-	9	6.7	3	4.1
Onondaga	Syracuse	1	2.8	10	5.7
<u>Ohio:</u>					
Hamilton and Butler	Cincinnati	-	-	20	7.4
Lucas	Toledo	25	12.4	20	8.5

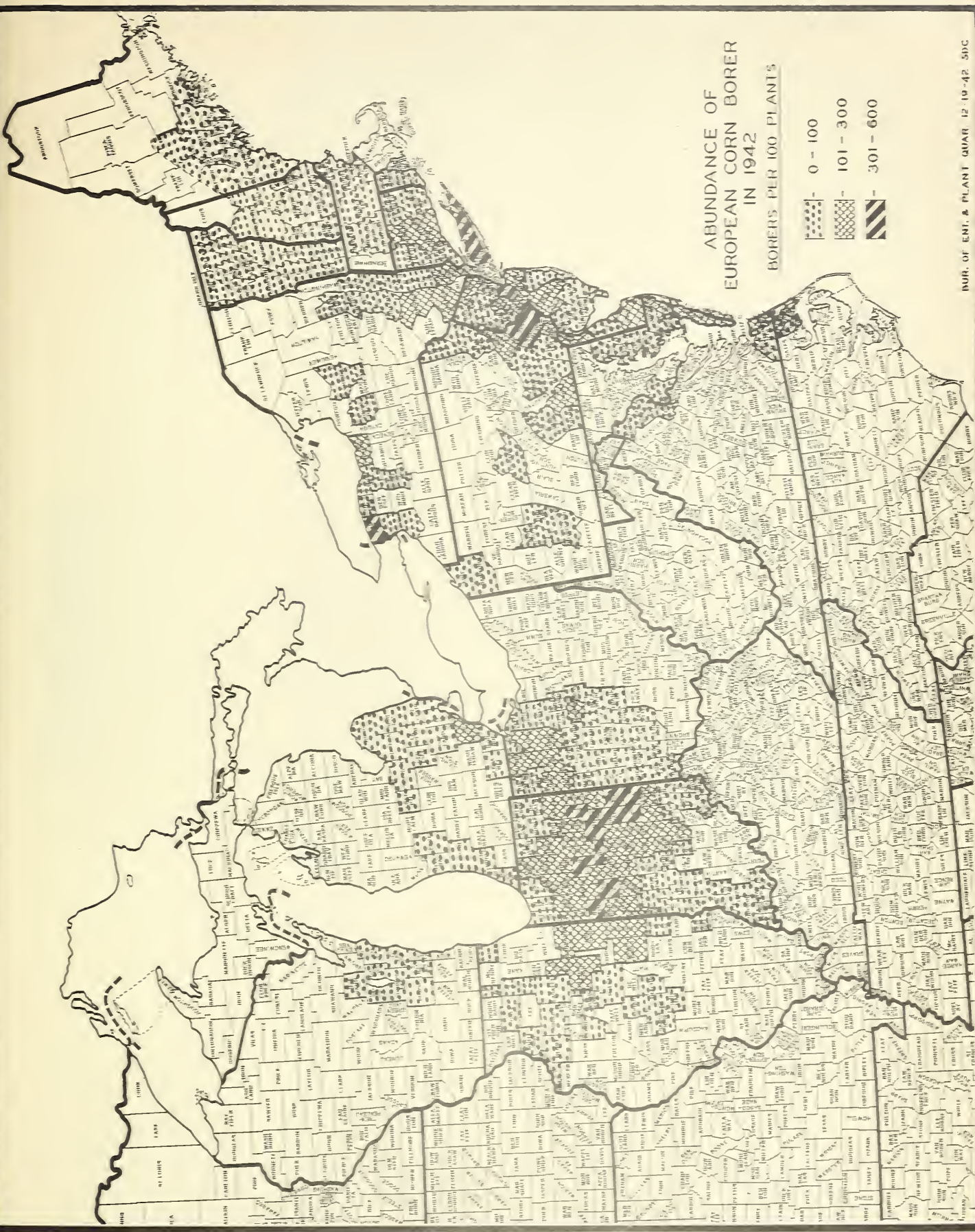
^{1/}Mostly canning corn.

NEW DISTRIBUTION OF THE EUROPEAN CORN BORER IN 1942

- COUNTRIES WHICH
WERE FIRST FOUND
INFESTED IN 1942







ABUNDANCE OF EUROPEAN CORN BORER IN 1942

BORES PER 100 PLANTS

